DOCUMENT RESUME

ED 065 561 TM 001 748

TITLE	Medical Assistant (medical ser.) 079.386-022--Technical Report on Development of USTES Aptitude Test Battery.
INSTITUTION	Manpower Administration (DOL), Washington, D.C. U.S. Training and Employment Service.
REPORT NO	S-237
PUB DATE	Oct 70
NOTE	18p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Aptitude Tests; *Cutting Scores; Evaluation Criteria; Job Applicants; *Job Skills; *Medical Assistants; Nonprofessional Personnel; Norms; Occupational Guidance; *Personnel Evaluation; Test Reliability; Test Validity
IDENTIFIERS	GATB; *General Aptitude Test Battery

ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample and a personnel evaluation form are also included. (AG)

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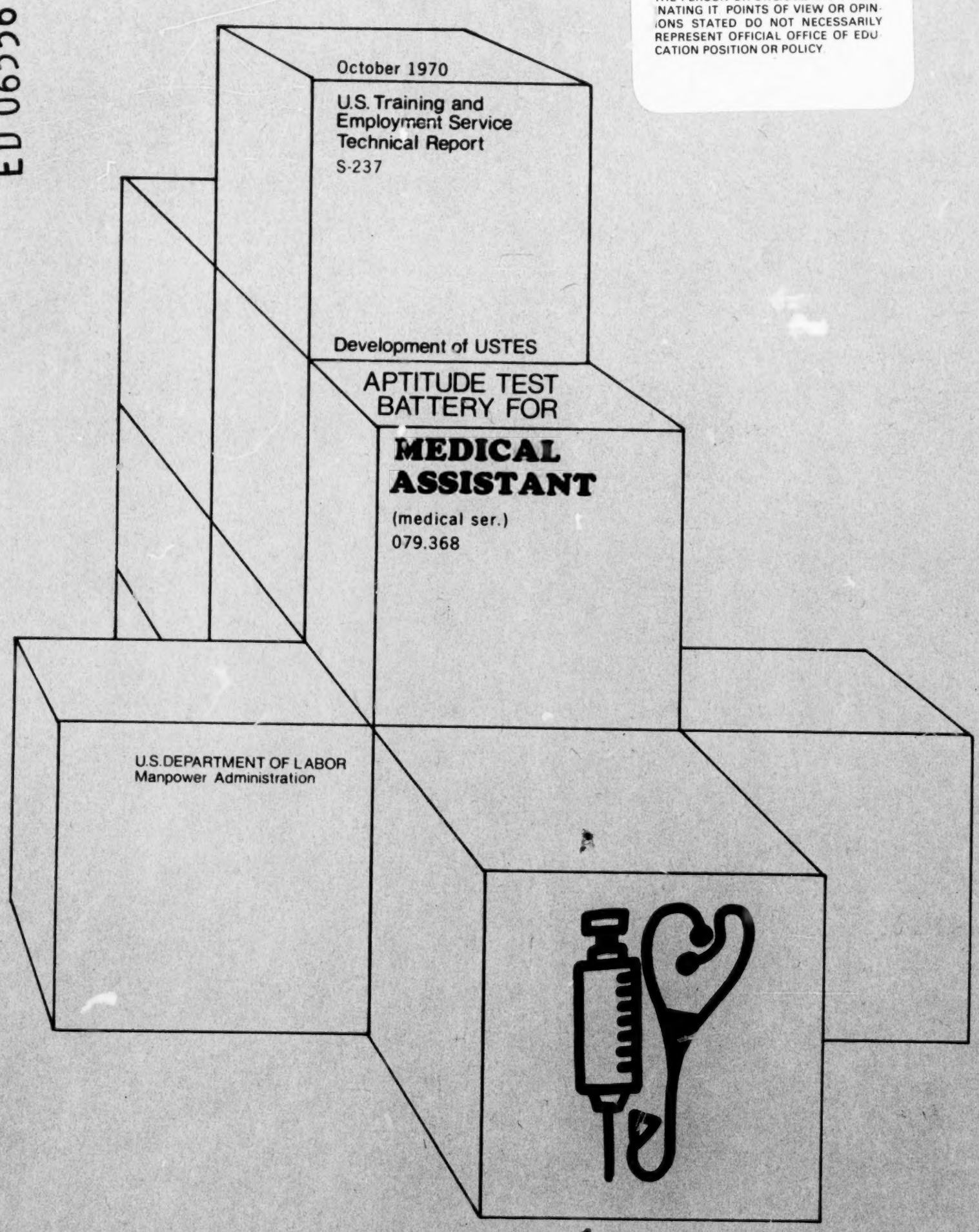

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Technical Report on Development of USTES Aptitude Test Battery

For . . . .

Medical Assistant (medical ser.) 079.368-022

S-237

(Developed in Cooperation with the California and
Colorado State Employment Services)

U.S. Department of Labor
Manpower Administration

October 1970

FOREWORD

The United States Training and Employment Service General Aptitude Test Battery (GATB) was first published in 1947. Since that time the GATB has been included in a continuing program of research to validate the tests against success in many different occupations. Because of its extensive research base the GATB has come to be recognized as the best validated multiple aptitude test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 aptitudes: General Learning Ability, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, in combination, predict job performance. For any given occupation, cutting scores are set only for those aptitudes which contribute to the prediction of performance of the job duties of the experimental sample. It is important to recognize that another job might have the same job title but the job content might not be similar. The GATB norms described in this report are appropriate for use only for jobs with content similar to that shown in the job description included in this report.

GATB Study # 2401, 2818

Development of USTES Aptitude Test Battery

For

Medical Assistant (medical ser.) 079.368-022

S-237

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Medical Assistant (medical ser.) 079.368-022. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
G - General Learning Ability	85
V - Verbal Aptitude	105
N - Numerical Aptitude	80
Q - Clerical Perception	95

Research Summary-Validation Sample

Sample:

49 female workers employed as Medical Assistants in Colorado. This study was conducted prior to the requirement of providing minority group information. Therefore, minority group composition is unknown.

Criterion:

Supervisory ratings.

Design:

Concurrent (test and criterion data were collected at approximately the same time).

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, aptitude-criterion correlations and selective efficiencies.

Concurrent Validity:

Phi Coefficient = .45 ($P/2 < .005$)

Effectiveness of Norms:

Only 67% of the nontest-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 84% would have been good workers. Thirty-three percent of the nontest-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 16% would have been poor workers. The effectiveness of the norms is shown graphically in Table 1:

TABLE I

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	67%	84%
Poor Workers	33%	16%

SAMPLE DESCRIPTION

Size:

N = 49

Occupational Status:

Employed Workers

Work Setting:

Workers were employed by various physicians' offices in Denver, Boulder, Colorado Springs, Greeley and Pueblo, Colorado.

Employer Selection Requirements:

Education: None specified.

Previous Experience: None required.

Tests: Some workers had been give clerical and intelligence tests.

Other: Personal interview. Preference given to individuals having a knowledge of medical terminology, ability to type and use transcription machine, and ability for simple bookkeeping.

Principal Activities:

The job duties for each worker are comparable to those shown in the job description in the Appendix.

Minimum Experience:

All workers in the final sample had at least three months job experience.

TABLE 2

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education and Experience

	Mean	SD	Range	r
Age (years)	43.8	8.7	28-65	-.119
Education (years)	12.9	1.3	10-16	.132
Experience (months)	63.6	62.3	3-308	-.034

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B, were administered in August and September 1961.

CRITERION

The criterion data consisted of supervisory ratings of job proficiency made at approximately the same time as the tests were administered with a time interval of two weeks between the two ratings. The employing physician rated each worker.

Rating Scale:

Form SP-21 "Descriptive Rating Scale" was used. The scale (see Appendix) consists of nine items covering different aspects of job performance. Each item has five alternative responses corresponding to different degrees of job proficiency.

Reliability:

A reliability coefficient of .95 was obtained between the initial ratings and the re-ratings, indicating a significant relationship. The final criterion score consists of average of the first and second ratings.

Criterion Score Distribution:

Possible Range:	9-45
Actual Range:	19-45
Mean:	35.8
Standard Deviation:	6.2

Criterion Dichotomy:

The criterion distribution was dichotomized into low and high groups by placing 33% of the sample in the low group to correspond with the percentage of workers considered unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers." The criterion critical score is 35.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Tables 3, 4 and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performance)

Aptitudes	
G - General Learning Ability	Required in order to learn the many ramifications of the job such as first aid, bookkeeping, typing, insurance, etc.
V - Verbal Aptitude	Required in order to take instructions from physicians and compose letters.
N - Numerical Aptitude	Required in bookkeeping.
Q - Clerical Perception	Required in bookkeeping and laboratory work.
F - Finger Dexterity	Required in the administration of injections, bandaging, assisting in minor surgery, typing and laboratory work.

TABLE 4

Means, Standard Deviations (SD), Ranges and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N=49

Aptitudes	Mean	SD	Range	r
G - General Learning Ability	107.1	14.5	74-133	.448**
V - Verbal Aptitude	114.6	16.1	90-152	.345*
N - Numerical Aptitude	104.4	15.8	65-131	.515**
S - Spatial Aptitude	97.6	14.6	68-130	.272
P - Form Perception	99.1	16.8	59-133	.244
Q - Clerical Perception	112.3	17.9	70-158	.366*
K - Motor Coordination	106.2	19.2	43-142	.231
F - Finger Dexterity	102.4	19.8	54-151	.206
M - Manual Dexterity	92.5	20.2	44-131	.224

*Significant at the .05 level
**Significant at the .01 level

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X	X	X			X		X	
Irrelevant									
Relatively High Mean	X	X				X			
Relatively Low Standard Dev.	X			X					
Significant Correlation with Criterion	X	X	X			X			
Aptitudes to be Considered for Trial Norms	G	V	N			Q			

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of the degree to which trial norms consisting of various combinations of aptitudes G, V, N and Q at trial cutting scores were able to differentiate between the 67% of the sample considered to be good workers and the 33% of the sample considered to be poor workers. Trial cutting scores at five-point intervals approximately one standard deviation below the mean are tried because this will eliminate about one-third of the sample with three-aptitude norms. For four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about one-third of the sample; for two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about one-third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Norms of G-85, V-105, N-80, and Q-95 provided optimum differentiation for the occupation of Medical Assistant (medical ser.) 079.368-022. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .45 (statistically significant at the .005 level).

TABLE 6

Concurrent Validity of Test Norms
G-85, V-105, N-80 and Q-95

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	6	27	33
Poor Workers	11	5	16
Total	17	32	49

Phi Coefficient = .45 Chi Square (X^2y) = 10.0

Significance Level = $P/2 < .005$

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study meet the requirements for incorporating the occupation studied into OAP-17 which is shown in the 1970 edition of Section II of the Manual for the General Aptitude Test Battery. A phi coefficient of .40 is obtained when the OAP-17 norms of G-90, V-90 and Q-100 are applied to the combined validation and cross-validation samples.

Medical Assistant (medical ser.) 079.368-022

Check Study #1 Research Summary

Sample:

51 females enrolled in a Medical Assistant program at Contra Costa College in California. The sample was composed of 2 minority group and 49 non-minority group individuals.

TABLE 7

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with Criterion (r) For Age, Education and GATB Aptitudes for Check Study #1.

	Mean	SD	Range	r
Age (years)	21.4	6.5	17-47	-.048
Education (years)	12.1	.3	12-13	.160
G - General Learning Ability	106.6	14.3	79-137	.623**
V - Verbal Aptitude	106.9	15.3	84-145	.655**
N - Numerical Aptitude	105.5	14.6	70-139	.611**
S - Spatial Aptitude	103.8	15.6	68-133	.096
P - Form Perception	108.6	14.1	81-145	.270
Q - Clerical Perception	119.5	14.5	80-150	.488**
K - Motor Coordination	116.1	17.8	78-175	.215
F - Finger Dexterity	105.5	18.1	75-183	.026
M - Manual Dexterity	105.6	20.1	64-159	-.138

**Significant at the .01 level

Criterion:

The grade point average achieved in at least ten semester units of study directly concerned with medical assisting. The criterion data were collected from September 1967 through January 1969.

Design:

Concurrent (test and criterion data were collected at approximately the same time).

Principal Activities:

A description of such for each student is shown in the course description in the Appendix.

Concurrent Validity:

Phi Coefficient = .32 ($P/2 < .025$)

Effectiveness of Norms:

Only 67% of the non-test selected students used for this study were good students; if the students had been test-selected with the S-237 norms, 86% would have been good students. 33% of the non-test-selected students used for this study were poor students; if the students had been test-selected

with the S-237 norms, only 14% would have been poor students. The effectiveness of the norms is shown graphically in Table 6.

TABLE 8

Effectiveness of S-237 Norms with Check Study Sample #1

	Without Test	With Test
Good Students	67%	86%
Poor Students	33%	14%

TABLE 9

Concurrent Validity of S-237 Norms with Check Study Sample #1
(G-85, V-105, N-80, Q-95)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Students	15	19	34
Poor Students	14	3	17
Total	29	22	51

Phi Coefficient (ϕ) = .32 Chi Square (X^2y) = 5.3
Significance Level = $P/2 < .025$

SP-21
Rev. 2/61

A-P-P-E-N-D-I-X

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read Form SP-20, "Suggestions to Raters", and then fill in the items listed below. In making your ratings, only <u>one</u> box should be checked for each question.

Name of Worker (print) _____
(Last) (First)

Sex: Male_____ Female_____

Company Job Title: _____

How often do you see this worker in a work situation?

☐ **See him at work all the time.**

☐ **See him at work several times a day.**

☐ **See him at work several times a week.**

☐ **Seldom see him in work situation.**

How long have you worked with him?

☐ **Under one month.**

☐ **One to two months.**

☐ **Three to five months.**

☐ **Six months or more.**

A. How much work can he get done? (Worker's <u>ability</u> to make efficient use of his time and to work at high speed.)

- ☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.
- ☐ 2. Capable of low work output. Can perform at a slow pace.
- ☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.
- ☐ 4. Capable of high work output. Can perform at a fast pace.
- ☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

- ☐ 1. Performance is inferior and almost never meets minimum quality standards.
- ☐ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.
- ☐ 3. Performance is acceptable but usually not superior in quality.
- ☐ 4. Performance is usually superior in quality.
- ☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

- ☐ 1. Makes very many mistakes. Work needs constant checking.
- ☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.
- ☐ 3. Makes mistakes occasionally. Work needs only normal checking.
- ☐ 4. Makes few mistakes. Work seldom needs checking.
- ☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

☐ 1. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Often has difficulty handling new situations. Needs help on all but simple problems.

☐ 3. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

☐ 4. Usually able to handle new situations. Needs help on only complex problems.

☐ 5. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. How many practical suggestions does he make for doing things in better ways? (Worker's ability to improve work methods.)

☐ 1. Sticks strictly with the routine. Contributes nothing in the way of practical suggestions.

☐ 2. Slow to see new ways to improve methods. Contributes few practical suggestions.

☐ 3. Neither quick nor slow to see new ways to improve methods. Contributes some practical suggestions.

☐ 4. Quick to see new ways to improve methods. Contributes more than his share of practical suggestions.

☐ 5. Extremely alert to see new ways to improve methods. Contributes an unusually large number of practical suggestions.

I. Considering all the factors already rated, and <u>only</u> these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

October 1970

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FACT SHEET

Job Title: Medical Assistant (medical ser.) 079.368-022

Job Summary:

May assist doctor by preparing patients for examination, treatment and minor surgery. May administer shots, perform lab work, keep books, etc. May perform any of the following duties alone/or in combination:

Receptionist:

May receive patients in an office of a physician, obtaining identifying data and confirming appointments. Keeps records, receives money in payment of bills, and answers inquiries of a non-technical nature.

Secretary:

May transcribe reports, case histories, correspondence, and other matter from dictated or recorded material, using a typewriter. May perform general office work in relieving doctor of minor executive and clerical duties. May handle mail, answer and make phone calls.

Bookkeeper:

May keep complete and systematic set of records of business transactions, examining and recording transactions in record books and on forms. May prepare and mail monthly statements to patients.

Medical Technologist:

May perform various routine laboratory tests requested by physician. Determines the type of test or tests to be conducted. Obtains laboratory specimens. Has knowledge of use of technical equipment and apparatus. Conducts biochemical and microscopic analyses such as blood tests, blood counts, urinalyses, Wasserman Tests, bacterial tests and other medical laboratory tests.

Nurse:

May assist physician in the care and treatment of patients in his office. Gives patients infection and X-Ray treatments. Assists in emergency and minor operations.

Course Summary: (Cross-Validation Sample)

To prepare the students with the necessary technical knowledge and skills for employment as medical assistants: attainment of a working knowledge of basic nursing procedures, laboratory, X-ray, and other technical duties which is specialized in certain respects.

Effectiveness of Norms:

Validation Sample:

Only 67% of the nontest-selected workers used for this study were good workers, if the workers had been test-selected with S-237 norms, 84% would have been good workers. 33% of the nontest-selected workers used for this study were poor workers; if the workers had been test-selected with S-237 norms only 16% would have been poor workers.

Cross Validation Sample:

Only 67% of the nontest-selected students used for this study were good students; if the students had been test-selected with the S-237 norms, 88% would have been good students. 33% of the non-test-selected students used for this study were poor students; if the students had been test-selected with the S-237 norms, only 12% would have been poor students.

Applicability of S-237 Norms:

The aptitude test battery is applicable to jobs which include a majority of the duties described above.

GPO 903.230

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